

>> Verticutting Kentucky bluegrass following a large tournament to push lateral growth for recovery.



# THREE KEYS

## to managing high traffic, high quality athletic fields



>> Top: Aerating immediately following a large soccer tournament (note the multiple sets of lines on the field); field got shifted over 2 days in a 4-day soccer tournament.  
>> Bottom: Sand spread in a lacrosse goal before a large tournament.

**A**S RECREATIONAL ADULT LEAGUES AND COMPETITIVE YOUTH CLUBS GROW in popularity, sports facilities and parks departments around the country are tackling the unique challenge of increased demand for matches and events. The rising level of competition provides a welcome change for facilities and departments feeling the pinch of the weak economy with budget cuts and decreased revenue.

But with change comes challenge, and this case is no exception. In response to increasing demand for outdoor sports and activities, cash-strapped facilities and departments must provide fields that are safe and prepared for play, while many times operating with limited resources. Sports Turf Managers are being called upon to find proactive and creative new solutions to maintain and even increase the quality of their athletic fields that are placed under higher traffic demands.

Pro-active and creative solutions come from a re-examination of the basic principles of turfgrass management.

Grass plants are living and breathing organisms, just like humans. As humans, we stay healthy through a balanced diet, hydration, and exercise. These habits keep our energy level high and help our immune system naturally fend off infections and diseases. With a proper nutrient intake, a strong root system, and the right amount of water, a

grass plant will sustain life much like the healthy human. A healthy plant can fend off diseases with a natural immune response and also withstand heavy traffic damage from play.

Keeping this human analogy in mind, let's examine three keys to help find new solutions to maintaining high traffic athletic fields: aggressive aeration, nutrient management, and traffic management. Aggressive aeration combined with a balanced nutrient management program creates a healthy, strong and durable stand of grass. Traffic management then addresses the abused areas directly and decreases the amount of repair work required on fields.

### AERATION

Concentrated foot traffic quickly compacts soil on fields, which eliminates air space and leads to suffocating roots. The gasping roots weaken and cause divots, which results in the stand of grass thinning

out. The weak roots also require additional hydration, yet water from irrigation and rainfall is not able to penetrate the compacted soils easily.

Aggressive aeration solves many of these problems by increasing turfgrass density and decreasing water usage. Because water is better able to move through the soil profile, it also decreases the number of events cancelled due to rainfall.

Dictionary.com defines the word "aggressive" as "vigorously energetic, especially in the use of initiative and forcefulness." This definition is an excellent outline to use in your decision making towards aeration. An aeration program should be "vigorously ener-

### Nutrient management

A high-traffic nutrient management program can focus on three areas:

- Maintaining nitrogen in consistent, low levels
- Using the plant essential micro-nutrients for different plant stresses
- Expanding a bio-stimulant program in order to provide a plant with necessary, naturally-produced hormones, carbohydrates, and amino acids

getic”: implemented a minimum of 1-2 times per month. It should show “initiative and forcefulness”: taking place in short windows of opportunity between events and in conditions that may not typically be seen as ideal (such as heat, at night, etc).

FC Dallas Stadium, a high-traffic soccer and football field (and 2011 STMA Professional Soccer Field of the Year) sets the standard for what it means to be “aggressive.” Sports Field Manager Allen Reed aerates his field *every* Monday.

Elsewhere, the Maryland SoccerPlex has 1-2 machines continually aerating their 19 natural grass fields. The non-stop process equates to a 10-day cycle between aerations on fields that host more than 350 events apiece each year from soccer, lacrosse, and sports camps.

Sporting Kansas City’s Swope Park Training Center fields, placed under high demands as well, never pass an aeration window of 14-21 days.

This aggressive aeration keeps grass fields from experiencing turfgrass decline due to compaction. It also keeps water moving vertically through the field’s soil profile, increasing irrigation efficiency and reducing rainouts.



>> Experimentation with new methods of aeration to prepare and recover fields for heavy traffic.

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Maintain nitrogen in consistent, low levels. Nitrogen is one of three key macronutrients required for maintained plant growth and health. Because nitrogen is key in producing proteins, it should always be present. However, excessive nitrogen leads to faster growth,

which is a factor in turfgrass destruction on high-traffic fields.

Whereas faster growth could be seen as essential to a plant’s recovery time, the faster growth actually weakens the cell walls of the plant. Just as a child who is growing quickly can have weak bones, the plant’s cell walls become weak and thin. They are easily invaded by pathogens and punctured by traffic. A stand of turf subjected to aggressive nitrogen fertilization will thin out quickly in the high traffic areas and will be prone to diseases such as brown patch and pythium.

Another aspect to note is soils with levels of organic matter contain carbon, a source of nitrogen. As summer temperatures rise and soil microbial activity increases, organic matter breaks down and releases this carbon into the soil as a natural nitrogen source. Soil testing to track the estimated nitrogen release (ENR) from the soil is important to monitor the release. The release potential in combination with a controlled fertilization program avoids a “flush” of aggressive turfgrass growth, resulting in the weak cell walls and thinning of the turfgrass stand. Additionally, “flush” growth causes the plant to burn more energy, using up the carbohydrate reserves stored in its roots. These reserves are essential for the plant to survive the summer heat, when respiration uses up more energy than photosynthesis can produce.

For each stress that turfgrass experiences, there are nutrients like manganese, calcium, and potassium that a plant finds essential to counteract that stress. From weather-related issues like heat, drought, excessive rainfall, lack of sunshine, and cold weather, to mowing, aeration, and heavy traffic, turfgrass is constantly under stress. When a Sports Turf Manager can provide those nutrients that are essential for maintaining plant health through each stress, the plant is able to continue to thrive and sustain the heavy traffic and the stress.

### EXPANDING A BIOSTIMULANT PROGRAM

Because of environmental stresses such as drought, lack of sun, heat, etc and constant physical stresses like mowing, traffic compaction, etc, the turfgrass plant is not able to perform its natural growth and development processes. Biostimulants are organic products that aid in plant metabolic processes such as respiration and photosynthesis. Essentially, biostimulants help the plant maintain growth despite stress. Biostimulants include natural-occurring ingredients such as plant hormones, carbohydrates, amino acids, and anti-oxidants.

Plant hormones serve as “signaling molecules” for plant growth by carrying messages from one part of the plant to another. The critical growth hormones in turfgrass are auxins, cytokinins and gibberellins. Auxins signal root growth and development, and work with cytokinins to initiate shoot growth. Gibberellins help supply food for new cell growth, and promote cell division and elongation in the leaf blade of the grass plant.

Sports Turf Managers can use biostimulants to supply the naturally occurring hormones in accordance with the particular stress. These hormones will then signal the needed action by the plant. When root development and density is needed, auxins and cytokinins can be applied to drive roots. If recovery is required, gibberellins are applied to promote vertical growth. When used in





>> Overseeding a native soil Kentucky bluegrass field. The KBG fields at SoccerPlex receive more than 750 hours of traffic per year.



>> **Top right:** Thirty-five soccer matches in 7 days on SoccerPlex Stadium (2011 FOY). Note the multiple lines (full sided that got slid over during a weekend tournament and small sided fields for matches that got played during the week prior).



>> **Bottom right:** Lacrosse field shifted to the far side of the field.

proper balance, these three hormones work together to reach the end goal of healthy, natural growth.

Plants dealing with heavy traffic and stress also benefit from extra amino acids and carbohydrates. As needed, managers can supplement these “vitamins” to sustain the natural plant processes like photosynthesis, respiration, and recovery from antioxidants.

With the use of biostimulants in conjunction with plant growth regulators, Sports Turf Managers are able to exercise more control over plant growth processes. Different demands on fields and un-

predictable weather conditions change the needs of the turfgrass plant almost daily, so monitoring plant processes at all times in conjunction with weather and traffic sets the “diet” for maintained plant health throughout the year.

### TRAFFIC MANAGEMENT

Traffic management is the most labor-intensive piece of the puzzle for high traffic field success. However, the cost of labor on the front side of field deterioration should be seen as pro-active and preventative. Overall, it actually saves money and labor once a field requires sod work or a field must be closed for a complete renovation. Managing traffic effectively will allow all fields to remain open during the full duration of the event season and require less “repair” work.

Traffic management includes two parts: Re-sizing and shifting fields to adjust traffic patterns; and addressing traffic patterns directly to improve weak areas

Re-sizing and shifting field layouts moves high traffic areas and provides the embattled turfgrass in those areas a chance to recover. Soccer and lacrosse fields have the most flexibility for re-sizing and shifting because the rules call for minimums and maximums on the competition dimensions.

Start with shifting the center of the field. The core of soccer and lacrosse is played up and down the center of the field. High traffic areas such as goalmouths, referee lines, and bench areas get moved accordingly with the move of the field center.

Swapping the side of the bench areas is also important. Teams for all sports warm up directly in front of their bench. In one day of seven soccer matches, a 15-yard x 15-yard area directly in front of each bench sees a minimum of 126 players stretching and kicking to get loose. Rotating the bench areas from one side of the field to the other in conjunction with shifting the field allows the field to experience optimum recovery.

American football fields are much narrower than soccer or lacrosse fields, so they too can be shifted and moved. This is especially true for practice fields where goal posts are not required. With a slight shift, the heavy traffic area of the center of the field allows recovery.

The key to football, as with all sports, is to spend time communicating and educating the user groups and coaches to empower



>> Repainting lacrosse fields (at night) 2 days into a 4-day lax tournament (fields took 36 games of lax in 4 days due to the move).



them as stewards of the field. “Telling” or “demanding” these changes does not work. Educate them. Include them in the discussions to attempt to understand their needs. Empower them with the goal of improving the field quality.

Setting forward on a program to move and re-size fields should start and end with a positive message that the field is going to be in professional condition with reduced closure time for renovation. No coach or administrator will argue with a better field. But the message has to be positive make sense. Yes, it will be a challenge. But communication will serve key in success.

### ADDRESSING TRAFFIC PATTERNS DIRECTLY

In conjunction with re-sizing and moving fields, apply intense maintenance directly to the high traffic areas. Customarily, an athletic field is maintained in a uniform manner across the field. And in some situations, that standard can still be followed. But under high traffic conditions, extra care must be given to the areas degraded by the heavy traffic in order to maintain their quality compared to the rest of the fields.

Soccer traffic creates a diamond-shaped pattern that stretches from the goal box to the touch sideline at midfield, and then back to the goal box on the other end. Add extra aeration and nutrient applications to those areas.

Small-sided soccer fields have a wear pattern across the width of the full soccer field, requiring less maintenance to the center of the

big field but more across the width. Rotate mall-sided play with full-sided play to allow for recovery. For lacrosse, topdress inside the arch and crease areas heavily with sand. The sand protects the crown of the plant from the direct traffic that these areas receive. For recovery purposes, aeration and nutrient applications are focused to the worn areas as the field is shifted away from that area.

American football fields should be topdressed heavier down the center than the outsides. More aeration should take place through the center in conjunction with a completely different nutrient management approach.

The success of “managing traffic” will be evident in increased quality of your high traffic fields. With the extra work that goes into field movement, sod work will nearly be reduced and/or eliminated. And as your traffic management process evolves, the condition of high traffic fields will continue to improve as you discover new ideas and try different approaches that fit your specific situation.

Using these three methods, Sports Turf Managers will find proactive and creative solutions for meeting the demands of high traffic athletic fields. As Sports Field Managers, we all constantly adjust our approach due to many variables: weather, resources, and coaching demands. But incorporating these new practices will help produce healthy, strong and durable grass plants that can withstand heavy traffic and also reduce spending on expensive fungicides, grass seed, and irrigation. ■